

KL



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/197,767	11/23/1998	HISASHI OHTANI	0756-1896	1677

22204 7590 05/29/2002

NIXON PEABODY, LLP
8180 GREENSBORO DRIVE
SUITE 800
MCLEAN, VA 22102

EXAMINER

CAO, PHAT X

ART UNIT PAPER NUMBER

2814

DATE MAILED: 05/29/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/197,767

Applicant(s)

Ohtani et al.

Examiner

Phat X. Cao

Art Unit

2814



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Apr 18, 2002
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6, 9, 10, 15, 16, 22-27, 40, and 46-74 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 9, 10, 15, 16, 22-27, 40, and 46-74 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 18, 21 6) ☐ Other: _____

Art Unit: 2814

DETAILED ACTION

1. The Request for Continued Examination filed 4/18/02, in Paper No. 24 is acknowledged.
2. In the letter filed 2/25/02 (Paper No. 19), Applicant requests that the Examiner evidence consideration of the references cited in the Information Disclosure Statement of October 31, 2001 by providing a copy of the initialed Form PTO-1449. However, there is no record of PTO-1449 of **October 31, 2001** has been filed.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 47, 51, 55, 59, 63, 67-68 and 71-72 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato (US. 6,081,305) in view of Fukunaga et al (US. 5,706,064).

With respect to claims 1, 47, 51, 55, 59, and 63, Sato et al disclose in Fig. 2 a semiconductor device comprising: a transistor; at least one interlayer insulating film 170 formed over the transistor, the interlayer insulating film 170 having a contact hole; an embedded conductive layer 171 provided to fill the contact hole wherein a top surface of the embedded conductive layer 171 is flush with a top surface of the interlayer insulating film 170; and a reflective pixel electrode 181 formed on the interlayer insulating film 170 wherein the reflective

Art Unit: 2814

pixel electrode 181 is electrically connected to the transistor through the embedded conductive layer 171.

Sato et al do not disclose the embedded conductive layer 171 being made from the materials as claimed.

However, Fukunaga et al, in Fig. 17, teach that the embedded conductive layer 411b is made of inorganic oxide conductive layer of ITO or ZnO (column 30, lines 43-46 and column 5, lines 66-67 through column 6, lines 1-3) or made of organic conductive layer of carbon (column 20, lines 36-48) or polymer (column 26, lines 54-61). Accordingly, it would have been obvious to form Sato's embedded conductive layer with the materials as set forth above, because such materials would provide a color liquid crystal display devices having high speed response, low power consumption, and low prices, as taught by Fukunaga et al (column 3, lines 30-34).

With respect to claims 67-68 and 71-72, Fukunaga et al (Fig. 17) further teach the obviousness of forming an embedded conductive layer 411b comprising a same resin as the resin of the interlayer insulating film 413 (see column 19, lines 27-35 and column 42, lines 50-52), wherein the embedded conductive layer 411b comprises an organic resin film containing a conductive material dispersed therein or an inorganic film containing a conductive material disperse therein (column 41, lines 22-32).

5. Claims 2, 22-27, 40, 48, 52, 56, 60 and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al in view of Yamazaki (US. 5,990,542) and Fukunaga et al.

Art Unit: 2814

With respect to claims 2, 48, 52, 56, 60, and 64, as discussed above, Fig. 2 of Sato et al substantially reads on the claimed invention, except that it does not disclose the interlayer insulating film 170 comprising an organic resin.

However, Yamazaki teaches in Fig. 2B the obviousness of forming the interlayer insulating film 120 made of organic resin (column 5, lines 65-67). Accordingly, it would have been obvious to form the interlayer insulating film 170 of Sato et al with an organic resin, because according to Yamazaki, the interlayer insulating film made of the organic resin would suppress an electric field from the pixel electrode created later from being disturbed (column 6, lines 1-6).

Neither Sato nor Yamazaki discloses the embedded conductive layer being made from the materials as claimed.

However, Fukunaga et al, in Fig. 17, teach that the embedded conductive layer 411b is made of inorganic oxide conductive layer of ITO or ZnO (column 30, lines 43-46 and column 5, lines 66-67 through column 6, lines 1-3) or made of organic conductive layer of carbon (column 20, lines 36-48) or polymer (column 26, lines 54-61). Accordingly, it would have been obvious to form Sato's embedded conductive layer with the materials as set forth above, because such materials would provide a color liquid crystal display devices having high speed response, low power consumption, and low prices, as taught by Fukunaga et al (column 3, lines 30-34).

With respect to claims 22-27 and 40, Fukunaga et al also teach in column 1, lines 5-30 that because the liquid crystal display device has high image quality and can be used as switching elements, this kind of display device has been widely used as a display device in a personal

Art Unit: 2814

computer, television or the like. Accordingly, it would have been obvious to one ordinary skill in the art to apply the display device of Fukunaga et al to a display device of a cellular phone, a camcorder, etc., because it is an intended use.

6. Claims 3, 22-27, 40, 49, 53, 57, 61, 65, 69-70, and 73-74 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al in view of Okita (US. 6,097,453) and Fukunaga et al.

With respect to claims 3, 49, 53, 57, 61, and 65, Sato et al disclose in Fig. 2 a semiconductor device comprising: a transistor; a first interlayer insulating film 130 formed over the transistor; a drain electrode 141 formed on the first interlayer insulating film and electrically connected to a drain of the transistor through an opening of the first interlayer insulating film; a second interlayer insulating film 150 formed over the drain electrode and the first insulating film; a capacitor forming electrode 165 formed on the second interlayer insulating film 150 to form a capacitor between the drain electrode 141 and the capacitor forming electrode 165; a third interlayer insulating film 170 formed over the capacitor forming electrode and the second interlayer insulating film; contact holes 171 and 151 opened through the third and second interlayer insulating films to reach the drain electrode; an embedded conductive layer filled in the contact holes; and a reflective pixel electrode 181 is electrically connected to the drain electrode through the embedded conductive layer.

Sato et al do not disclose that the contact holes 171 and 151 are formed as a single contact hole opened through the third and second insulating films.

Art Unit: 2814

However, Okita teaches in Fig. 6 the obviousness of forming a single contact hole 508 opened through the third insulating film 109 and second insulating film 601 to reach the drain electrode 108. Accordingly, it would have been obvious to modify the contact holes 171 and 151 of Sato et al by forming a single contact hole, because as is well known, the forming of a single contact hole as taught by Okita would reduce the number of steps in fabricating process.

Neither Sato nor Okita discloses the embedded conductive layer being made from the materials as claimed.

However, Fukunaga et al, in Fig. 17, teach that the embedded conductive layer 411b is made of inorganic oxide conductive layer of ITO or ZnO (column 30, lines 43-46 and column 5, lines 66-67 through column 6, lines 1-3) or made of organic conductive layer of carbon (column 20, lines 36-48) or polymer (column 26, lines 54-61). Accordingly, it would have been obvious to form Sato's embedded conductive layer with the materials as set forth above, because such materials would provide a color liquid crystal display devices having high speed response, low power consumption, and low prices, as taught by Fukunaga et al (column 3, lines 30-34).

With respect to claims 22-27 and 40, Fukunaga et al also teach in column 1, lines 5-30 that because the liquid crystal display device has high image quality and can be used as switching elements, this kind of display device has been widely used as a display device in a personal computer, television or the like. Accordingly, it would have been obvious to one ordinary skill in the art to apply the display device of Fukunaga et al to a display device of a cellular phone, a camcoder, etc., because it is an intended use.

Art Unit: 2814

With respect to claims 69-70 and 73-74, Fukunaga et al (Fig. 17) further teach the obviousness of forming an embedded conductive layer 411b comprising a same resin as the resin of the interlayer insulating film 413 (see column 19, lines 27-35 and column 42, lines 50-52), wherein the embedded conductive layer 411b comprises an organic resin film containing a conductive material dispersed therein or an inorganic film containing a conductive material disperse therein (column 41, lines 22-32).

7. Claims 4 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al in view of Okita and Yamazaki (US. 5,990,542).

As discussed in details above, the combination of Sato et al and Okita substantially reads on the claimed invention, including the known feature of forming a material normally used for the electrode (i.e., pixel electrode) in the semiconductor and TFT processes, such as aluminum (as taught by Okita, in column 6, lines 15-19).

The above combination does not disclose the third interlayer insulating film comprising an organic resin.

However, Yamazaki teaches in Fig. 2B the obviousness of forming the ITO pixel electrode on the interlayer insulating film 120 made of organic resin (column 5, lines 65-67). Accordingly, it would have been obvious to form the interlayer insulating film 170 of Sato et al with an organic resin, because according to Yamazaki, the interlayer insulating film made of the organic resin would suppress an electric field from the pixel electrode created later from being disturbed (column 6, lines 1-6).

Art Unit: 2814

8. Claims 54, 58, 62 and 66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al, Okita and Yamazaki as applied to claim (4,50) above, and further in view of Fukunaga et al.

None of the above references discloses the embedded conductive layer being made from the materials as claimed.

However, Fukunaga et al, in Fig. 17, teach that the embedded conductive layer 411b is made of inorganic oxide conductive layer of ITO or ZnO (column 30, lines 43-46 and column 5, lines 66-67 through column 6, lines 1-3) or made of organic conductive layer of carbon (column 20, lines 36-38) or polymer (column 26, lines 54-61). Accordingly, it would have been obvious to form Sato's embedded conductive layer with the materials as set forth above, because such materials would provide a color liquid crystal display device having high speed response, low power consumption, and low prices, as taught by Fukunaga et al (column 3, lines 30-34).

9. Claims 5, 16, 22-27, 40 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al in view of Fukunaga et al (US. 5,706,064).

With respect to claims 5 and 46, as discussed above, Fig. 2 of Sato et al substantially reads on the claimed invention, except it does not disclose that the embedded conductive layer comprises a same resin as the resin of the interlayer insulating film.

However, Fukunaga et al teach in Fig. 17 the obviousness of forming an embedded conductive layer 411b comprising a same resin as the resin of the interlayer insulating film 413 (see column 19, lines 27-35 and column 42, lines 50-52), wherein the embedded conductive layer

Art Unit: 2814

411b comprises an organic resin film containing a conductive material dispersed therein or an inorganic film containing a conductive material disperse therein (column 41, lines 22-32). Accordingly, it would have been obvious to form the embedded conductive layer and the interlayer insulating film with the resin as set forth above, in order to provide a substrate for a display device which can be used in liquid crystal in a high speed response mode and achieves a low price, such as taught by Fukunaga et al (column 1, lines 55-59).

With respect to claim 16, Fukunaga et al further teach that the embedded conductive layer 411b is made of inorganic oxide conductive layer of ITO or ZnO (column 30, lines 43-46 and column 5, lines 66-67 through column 6, lines 1-3) or made of organic conductive layer of carbon (column 20, lines 36-48) or polymer (column 26, lines 54-61), and one of the two conductive layers is in contact with an alignment film 517 (number 517 not shown in Fig. 17, see Fig. 27).

With respect to claims 22-27 and 40, Fukunaga et al also teach in column 1, lines 5-30 that because the liquid crystal display device has high image quality and can be used as switching elements, this kind of display device has been widely used as a display device in a personal computer, television or the like. Accordingly, it would have been obvious to one ordinary skill in the art to apply the display device of Fukunaga et al to a display device of a cellular phone, a camcoder, etc., because it is an intended use.

10. Claims 6 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki (US. 5,990,542) in view of Jun (US. 5,948,705).

Art Unit: 2814

Yamazaki discloses in Fig. 2B a semiconductor device comprising: a transistor; at least one interlayer insulating film 120 comprising an organic resin formed over the transistor, the interlayer insulating film 120 having a contact hole; a conductive layer 121 made of ITO formed on the interlayer insulating film wherein the conductive layer 121 extends into the contact hole and electrically connected to the transistor.

Yamazaki does not disclose a metal electrode formed on the conductive layer as claimed.

However, Jun teaches in Fig. 4E the obviousness of forming a metal electrode 48 on the embedded conductive layer 47, wherein at least one peripheral edge of the metal electrode 48 is coextensive with a peripheral edge of the embedded conductive layer 47. Accordingly, it would have been obvious to modify the conductive structure of Yamazaki by forming a metal electrode with the structures as set forth above for improving step coverage and for preventing a recess formation in the contact hole, such as taught by Jun (column 7, lines 35-41).

11. Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki and Jun as applied to claim 6 above, and further in view of Fukunaga et al (US. 5,706,064).

Neither Yamazaki nor Jun disclose the conductive layer comprising carbon dispersed in an organic or comprising a material selected from the group consisting of Zinc oxide, aluminum flakes and nickel flakes.

However, Fukunaga et al teach the obviousness of forming the embedded conductive layer 411b made of inorganic oxide conductive layer of ITO or ZnO (column 5, lines 66-67 through column 6, lines 1-3) or made of organic conductive layer of carbon (column 20, lines 36-37) or

Art Unit: 2814

polymer (column 26, lines 54-61). Accordingly, it would have been obvious to form the embedded conductive layer with the materials as set forth above, in order to provide a substrate for a display device which can be used in liquid crystal in a high speed response mode and achieves a low price, such as taught by Fukunaga (column 1, lines 55-59).

Response to Arguments

12. With respect to Sato, Applicant argues that Sato does not suggest the separate formation of an embedded conductive layer and a second conductive layer.

It should be noted that drawings and picture can anticipate claims if they clearly show the structure which is claimed. *In re Marz*, 173 USPQ 25 (CCPA 1972). When the reference is a utility patent, it does not matter that the feature shown is unintended or unexplained in the specification. The drawings must be evaluated for what they reasonably disclose and suggest to one of ordinary skill in the art. *In re Aslanian*, 200 USPQ 500 (CCPA 1979). In this case, Sato does suggest the invention as claimed because Fig. 2 clearly disclose that the embedded conductive layer 171 and the second conductive layer 181 are two different conductive portions.

Applicant further argues that it is not obvious to combine Jun with Yamazaki because Jun does not disclose the forming of a pixel electrode.

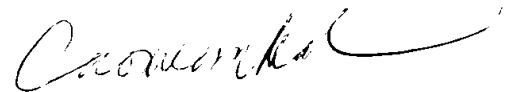
Art Unit: 2814

It should be noted that the rejection is not based on anticipation, but rather, is based on obviousness. Therefore, the arguments are not persuasive because Yamazaki does suggest the forming of a pixel electrode.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phat X. Cao whose telephone number is (703) 308-4917. The Examiner can normally be reached on Monday through Thursday. If attempts to reach the Examiner by telephone are unsuccessfully, the Examiner's supervisor, Olik Chaudhuri, can be reached on (703) 306-2794.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0956. Group 2800 fax number is (703) 308-7722 or (703) 308-7724.

PC
May 24, 2002


PHAT X. CAO
EXAMINER